

- or an organic solvent.
54. The antimicrobial composition of claim 53 wherein said organic solvent is an alkanolamine.
55. The antimicrobial composition of claim 45 which additionally comprises water or an organic solvent.
56. The antimicrobial composition of claim 55 wherein said organic solvent is an alkanolamine.
57. The antimicrobial composition of claim 1 wherein said zinc or copper or silver salts is selected from the group consisting of zinc or copper or silver sulfates, zinc or copper or silver chlorides, and combinations thereof.
58. The antimicrobial composition of claim 44 wherein said zinc or copper or silver salts is selected from the group consisting of zinc or copper or silver sulfates, zinc or copper or silver chlorides, and combinations thereof.

REMARKS

Entry of the above amendment is respectfully requested. Responsive to the outstanding restriction requirement, claims 4, 6, 7, 12-32 and 35-42 are hereby cancelled as being drawn to a non-elected invention. Claims 1-3, 5, 8-11, 33, 34, remain in this application. Claims 43-56 have been added.

Claim 9 stands rejected under 35 U.S.C. 112, second paragraph, as allegedly indefinite based upon the use of abbreviations "EDTA" and "EGTA". The abbreviations for those terms are spelled out in amended claim 9, as supported by the disclosure given at page 24, lines 5-6 of the instant specification.

Claims 1-3, 5, 8-11, 33 and 34 stand rejected under 35 U.S.C. 102(b) as allegedly anticipated by Kappock et al. Responsive to this rejection, claim 1 has been amended to recite a preferred weight ratio range of metal salt to pyrithione of from about 1:100 to about 1:1, as supported by the disclosure provided at page 25, line 19 of the instant specification. Claim 1 was also amended to remove specific metal salts that are covered by the generic class recited in the Markush group of that claim, and the specific salts are recited in new claim 57 depending from claim 1.

In accordance with the present invention, the antimicrobial effectiveness of pyrithione has been found to be enhanced by specific metal ions, namely silver, copper and zinc ions. This antimicrobial effectiveness was demonstrated against a variety of microorganisms, as described in the working examples provided at pages 33 through 67 of the instant specification. In contrast to the antimicrobial enhancement against microorganisms as instantly claimed, the Kappock patent describes a combination of "in-can" and "dry film" antimicrobial protection, wherein the latter is said to be provided by ion exchange of sodium pyrithione with zinc oxide to convert the water-soluble sodium pyrithione to relatively water-insoluble zinc pyrithione (see the paragraph bridging columns 2 and 3 of the Kappock patent). In other words, Kappock teaches lengthening the duration of antimicrobial effectiveness in a dry film by means of ion exchange to an insoluble salt of pyrithione. Kappock does not disclose or suggest immediately enhancing antimicrobial effectiveness against a variety of microorganisms, but rather extending the duration of efficacy.

Although the Kappock patent generically discloses a zinc compound-containing and pyrithione salt-containing composition having a molar range of ratios of pyrithione salt to zinc compound of between about 1:10 and about 10:1, this patent does not teach in favor of the instantly claimed range of weight ratios, and does not disclose any specific composition within the instantly claimed range. Regarding specific compositions, please note that the test results given at column 7, lines 20 through 46 of the Kappock patent are for test samples having high amounts of the zinc component (i.e., 1.25 wt% and 2.5 wt% of zinc oxide) relative to the pyrithione component (i.e. 1800 ppm or 0.18% of sodium pyrithione). Likewise, column 7, lines 47 through 52 of Kappock describes paints containing a large amount of zinc oxide (25 lbs/100 gallons of paint) relative to the smaller amount of pyrithione component (namely 3, 4 and 6 lbs/100 gallons of paint) in the Kappock compositions. Thus, the working examples of the Kappock patent recite ratios of the zinc component to the pyrithione component that are well above, and thus neither disclose nor suggest, the instantly claimed ratio of from 1:100 to about 1:1. Accordingly, the instant rejection of claim 1, and the claims depending therefrom, is untenable and should be withdrawn.

Claim 11 has been amended to recite a preferred range of from about 1:100 to about 1:10 for the weight ratio of metal source to pyrithione, as supported at page 25, line

18, of the instant specification. Kappock does not disclose or suggest this range of ratios, but instead teaches in favor of a higher range of ratios, as discussed above.

Claim 33 has been amended to provide proper antecedent basis for the term "water soluble zinc metal salt", as supported by that phrase in claim 33 as originally filed. In addition, claim 33 as amended recites a range of ratios of metal salt to pyrithione salt of about 1:100 to about 1:1. This claim is believed to be patentable over the Kappock patent for the reasons given above in regard to amended claim 1.

Newly added claims 43-58 all read on the species elected by applicants in Paper No. 8. Claim 43 is supported by claim 1 as originally filed, together with the sentence bridging pages 66 and 67 of the instant specification. Claim 44 is supported by claim 1 as originally filed, plus page 25, line 18 of the instant specification. Claims 45 and 46 have support corresponding to that provided above for amended claims 1 and 11, respectively.

Claims 47 through 56 are supported by the disclosure provided at page 26, lines 2-6 of the instant specification. Claims 57 and 58 are supported by the disclosure provided in claim 1 as originally filed.

It is respectfully submitted that, for the reasons discussed above, the Kappock patent neither discloses nor suggests the instantly claimed invention with the specified range of ratios of metal to pyrithione. Accordingly, a prima facie case of obviousness has not been established. The range of ratios disclosed in the Kappock patent actually teaches away from that instantly claimed. Even if a prima facie case of obviousness had been established (which it has not), the data provided in the instant working examples support a showing of differences between antimicrobial results within the instantly claimed range of ratios of metal to pyrithione, as distinguished from the Kappock range of ratios. Illustratively, Table 10a of the instant specification shows enhanced efficacy (as denoted by asterisks) for 1:10; 1:5; 1:3.3; and 1:1 ratios of zinc to pyrithione, but shows no enhanced efficacy for ratios of 5:1 or 10:1 within Kappock's suggested range. This difference in antimicrobial performance is neither disclosed nor suggested by the Kappock patent.

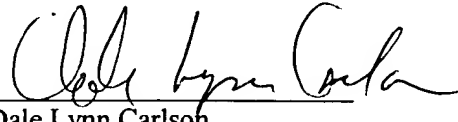
Accordingly, the outstanding rejection of the instant claims over Kappock is untenable and should be withdrawn. Withdrawal of the rejection and an early receipt of a Notice of Allowance are respectfully requested.

If the Examiner has any questions or believes that a discussion with Applicants' attorney would expedite prosecution, the Examiner is invited and encouraged to contact the undersigned at the telephone number below.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claim 1 has been amended as follows:

1. (once amended) An antimicrobial composition, comprising:
pyrithione or a pyrithione complex; and

a zinc or copper or silver source selected from the group consisting of zinc or copper or silver salts, zinc or copper or silver oxides, zinc or copper or silver hydroxides, ~~zinc or copper or silver sulfates, zinc or copper or silver chlorides,~~ zinc or copper or silver metals, zinc or copper or silver complexes, and combinations thereof;

wherein the weight ratio of said zinc or copper or silver source to said pyrithione or said pyrithione complex is in the range from about ~~1:300 to about 50:1~~ 1:100 to about 1:1, and wherein said antimicrobial composition has an enhanced biocidal effect against microorganisms selected from the group consisting of free-living microorganisms, parasitic microorganisms, adherent microorganisms, biofilms, and combinations thereof.

Claim 9 has been amended as follows:

9. (once amended) The antimicrobial composition of claim 8, wherein said complexing agent is selected from the group consisting of zeolites, titania, carbon, azoles, ~~EDTA, EGTA~~ ethylenediaminetetraacetic acid, ethylene-bis-(oxyethylenenitrilo)-tetra-acetic acid, crown ethers, cryptates, cyclodextrin, and combinations thereof.

Claim 11 has been amended as follows:

11. (once amended) The antimicrobial composition of claim 1, wherein said weight ratio of said zinc or copper or silver source to said pyrithione or said pyrithione complex is in the range of from about 1:100 to about ~~1:1~~ 1:10.

Claim 33 has been amended as follows:

33. (once amended) An antimicrobial composition for treating microorganisms selected from the group consisting of free-living microorganisms, parasitic microorganisms, adherent microorganisms, biofilms, and combinations thereof, comprising:
- a salt of pyrithione; and
- a water soluble zinc metal salt;
- wherein the weight ratio of said water-soluble zinc metal salt to said salt of pyrithione is in the range from about ~~1:300 to about 50:1~~ 1:100 to about 1:1, and
- wherein said antimicrobial composition has an enhanced biocidal effect against microorganisms selected from the group consisting of free-living microorganisms, parasitic microorganisms, adherent microorganisms, biofilms, and combinations thereof.